NSLS-II

Brookhaven National Laboratory

National Synchrotron Light Source II

fact sheet

Purpose

To provide extremely bright x-rays for basic and applied research in biology and medicine, materials and chemical sciences, geosciences and environmental sciences, and nanoscience and technology.

Sponsor

U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences.

Features

- State-of-the-art, medium-energy storage ring
- World-leading brightness from infrared light to hard x-rays
- 28 state-of-the-art beamlines with unique, cutting-edge research tools
- Space to add another 30 beamlines, complementing and extending the existing suite

User Community

- More than 900 international researchers from universities, laboratories, and industry every year
- Annual user meeting with presentations

www.bnl.gov/ps

BROOKHAVEN NATIONAL LABORATORY

National Synchrotron Light Source II

The National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory is one of the newest, most advanced synchrotron facilities in the world and a U.S. Department of Energy (DOE) Office of Science User Facility.

As a world-class light source, NSLS-II opened its doors to users in 2015 and is enabling its growing user community to study materials with nanoscale resolution and exquisite sensitivity by providing cutting-edge capabilities for x-ray imaging and high-energy resolution analysis. Researchers from around the world come to NSLS-II to focus on the most important challenges at the nanoscale, including studies in condensed matter and materials physics, chemistry, and biology.

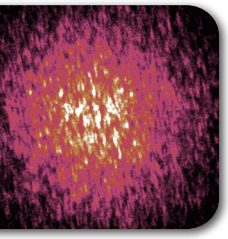
Meeting Critical Challenges

Meeting the critical scientific challenges of our energy future requires advanced and unique capabilities. These are being provided by NSLS-II.

NSLS-II is a state-of-the-art, medium-energy electron storage ring (3 billion electron-volts) with a highly stable electron beam. It is designed to deliver world-leading intensity and brightness, enable studies of materials under real operating conditions (operando), and investigate complex problems using multiple techniques (multimodal measurements).

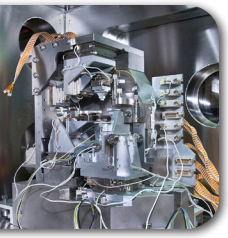
The facility also partners with Brookhaven's Center for Functional Nanomaterials–another DOE Office of Science User Facility–to integrate nanoscale synthesis and analysis tools with NSLS-II's capabilities, and to enable unprecedented exploration of the new materials that are expected to transform the nation's energy future.

Examples of Discovery-Class Science



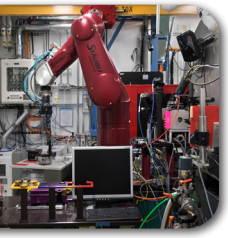
Self-assembly

Nanoscale imaging will improve scientists' ability to create large-scale structures from nanometer-scale building blocks. This research could help scientists develop new design approaches that mimic nature's ability to assemble nanomaterials into useful devices, more simply and economically.



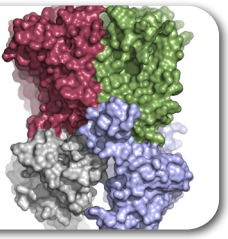
Clean and Affordable Energy

Imaging highly reactive gold nanoparticles inside porous structures and under real reaction conditions could lead to new materials that use sunlight to split water for hydrogen production and harvest solar energy with high efficiency and low cost.



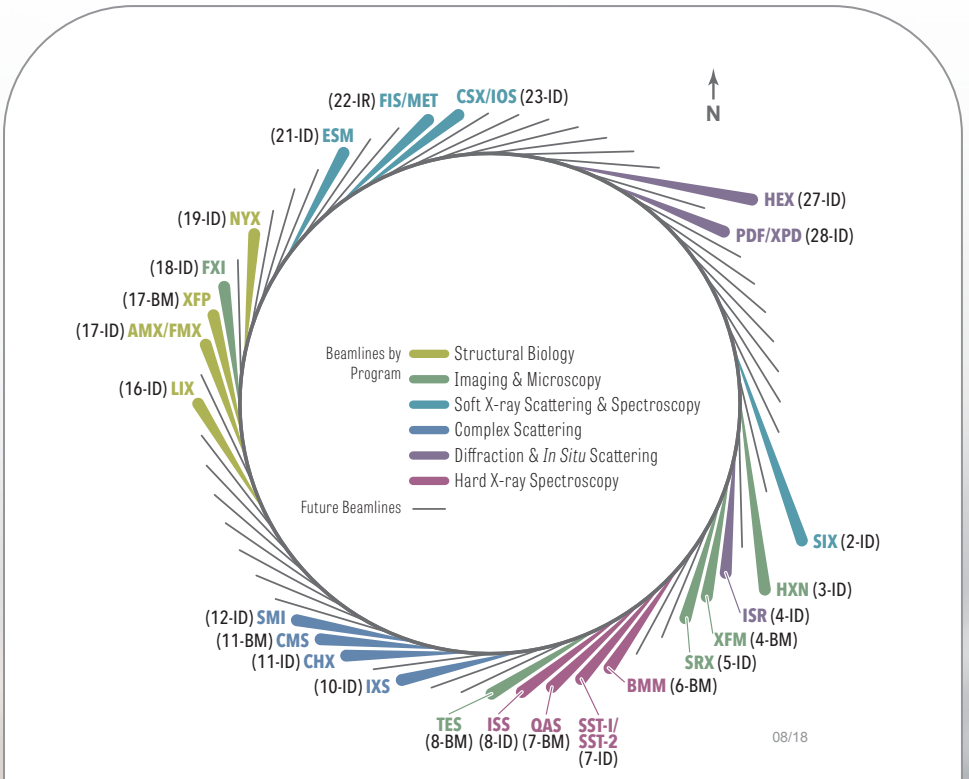
Molecular Electronics

NSLS-II enables scientists to observe fundamental properties with nanometer-scale resolution and atomic sensitivity. For example, new electronic materials beyond silicon could be used to make faster, less expensive, more energy-efficient electronics.



Structural Biology

The complex building blocks of biological systems should link together like well-oiled machines. At NSLS-II, we are uncovering the 3-D design of biological molecules and watching them in action–the first step towards designing more effective drugs to combat disease.



Tools for Discovery-Class Science

- A hard x-ray microscope with world-leading nanometer spatial resolution
- High-throughput, robot-driven sample processing
- Coherent scattering with unprecedented spatial and temporal resolution
- Beamlines designed and built in partnership with on-site facilities, federal agencies, and industry

Convenient Location

- 60 miles east of New York City
- Proximity to three major airports
- On-site housing for visiting researchers
- Close proximity to advanced partner research facilities such as the Center for Functional Nanomaterials

Become a User

www.bnl.gov/ps/userguide

- Beam time at NSLS-II is available at no charge to researchers
- Granted through a peer-review proposal process
- Proprietary access available at a full cost-recovery rate

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